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Brief Report

A Cross-Sectional Analysis of Expanding Maternity Care Deserts in Rural Kansas Counties, 2016-2023

Anna Carlson, MS-4, Brenda Aguirre, MS-4, Joshua Young, MS-2, Ryan Hoefferle, M.S., Michael Kennedy, M.D., Laurel B. Witt, M.D., M.Phil

ABSTRACT

Introduction. Rural Kansas accounts for one-quarter of the state's population and births. Living in rural areas is associated with delayed prenatal care, adverse birth outcomes, and higher infant mortality. Limited access to obstetric services, particularly in maternity care deserts (MCDs), defined as counties without hospitals or clinicians offering obstetric care, contributes to these disparities. Authors of this study assessed obstetric care availability in rural Kansas and compared findings with 2016 data.

Methods. In this cross-sectional study, rural hospitals were defined as those located in counties with <39.9 people per square mile using Kansas Department of Health and Environment (KDHE) data. Ninety-three hospitals were contacted by phone between August and October 2023. A survey, replicated from a 2016 study, assessed obstetric clinicians' availability, attrition, and anticipated retirements. Data were analyzed using descriptive statistics and Wilcoxon signed-rank tests.

Results. Of 93 hospitals, 66 (71.0%) responded. Among these, 38 (57.6%) reported no obstetric services and 28 (42.4%) offered services. Nine hospitals (32.1%) anticipated losing clinicians within five years, including one (3.5%) expecting complete loss. Among 28 hospitals with data from both years, 50.0% lost ≥1 provider and 21.4% lost all. Median provider counts declined from 5 (IQR 3-6.5) to 4 (IQR 2-5; p = 0.038). MCDs have continued to expand.

Conclusions. Obstetric care access in rural Kansas has declined, with expanding MCDs. These trends threaten maternal and neonatal outcomes and underscore the need for targeted strategies to sustain rural obstetric services.

INTRODUCTION

Approximately 25% of Kansans live in rural counties, and in 2020, 27% of births occurred in these areas.[1] Living in rural settings is associated with higher rates of delayed prenatal care, hospitalization, low birth weight, preterm birth, and infant mortality.[2] Limited access to obstetric services, particularly in maternity care deserts (MCDs), is a key contributor to these disparities. An MCD is defined as a county with no hospitals or birth centers offering obstetric care and no obstetric providers.[3]

As MCDs expand, access to essential childbirth services declines, increasing the risk of perinatal morbidity and mortality for both the pregnant individual and the infant.[4-6] Prior work by Kozhimannil et al.[1] demonstrated a decline in Kansas hospitals providing obstetric care. Since then, access may have further changed, potentially influenced by factors such as the COVID-19 pandemic. Authors of this study evaluated current obstetric care access in rural Kansas and compared it with pre-pandemic conditions.

METHODS

In this cross-sectional study, counties were classified using Kansas Department of Health and Environment (KDHE) definitions as frontier (<6 people per square mile [PPSM]), rural (6.1-19.9 PPSM), densely settled rural (20.0-39.9 PPSM), semi-urban (40.0-149.9 PPSM), or urban (>150 PPSM). Using Kansas Hospital Association data, we identified all hospitals in Kansas in 2023. Hospitals located in frontier, rural, or densely settled rural counties (collectively defined as "rural") were included, while those in semi-urban and urban counties (n = 30) were excluded. A total of 93 hospitals met inclusion criteria. The Institutional Review Board (IRB) at The University of Kansas Medical Center approved this study, which followed STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines.[7]

Survey instrument. A multi-question survey from a similar 2016 study was replicated (see appendix). It assessed: (1) the number of physicians providing obstetric services at each hospital; (2) the number of certified nurse midwives and lay midwives in the county; and (3) the number of physicians who had discontinued obstetric services since 2016 and the reasons for doing so.

Survey procedures. All 93 hospitals were contacted by phone between August and October 2023. Of these, 21 did not respond. To improve response rates, physicians affiliated with The University of Kansas Summer Training Option in Rural Medicine (STORM) program and practicing in those counties were contacted by email. Both phone and email responses were accepted, with no observed differences in interpretation.

Survey data were stored in Research Electronic Data Capture (REDCap®) hosted on a secure server at The University of Kansas Medical Center.[8,9] The 2016 dataset, provided by the original study's principal investigator (M. Kennedy), was used for comparison.

Statistical analysis. Clinician rates were calculated per 1,000 population using KDHE county population estimates. Counts and rates were summarized using medians and interquartile ranges (IQR), with distributions assessed visually. Analyses were limited to counties represented in both 2016 and 2023 (n = 28), yielding paired observations. The Wilcoxon signed-rank test was used to compare clinician counts due to non-normal distributions. Statistical significance was set at $\alpha = 0.05$. Analyses were conducted using R version 4.4.2 (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Sixty-six of 93 hospitals participated (71% response rate). Of these, 38 (57.6%) reported no obstetrical services, while 28 (42.4%)

reported providing such services. Nine facilities (32.1%) anticipate losing at least one obstetrical clinician within the next five years, and one hospital (3.5%) expects to lose all obstetrical clinicians.

Among the 28 hospitals that responded in both 2016 and 2023, 14 (50.0%) lost at least one obstetric clinician, and 6 (21.4%) lost all obstetric clinicians during that period.

The median number of obstetric clinicians per county declined from 5 (IQR 3-6.5) in 2016 to 4 (IQR 2-5) in 2023. The median clinician rate per county decreased from 0.37 (IQR 0.29-0.74) to 0.31 (IQR 0.13-0.63). Visual inspection of boxplots and histograms suggested similar distribution shapes (Figures 1 and 2). The Wilcoxon signed-rank test showed a significant decline in clinician counts ($V = 152$, $p = 0.004$), but not in clinician rates ($V = 287$, $p = 0.056$). However, clinician rates do not account for changes in the population of reproductive-age individuals and may therefore underestimate shifts in access to obstetrical care.

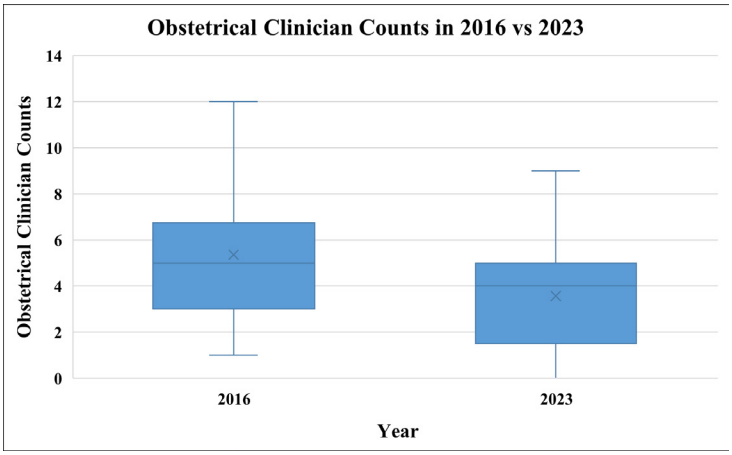

Figure 1. Boxplot comparing obstetrical clinicians in 2016 and 2023.

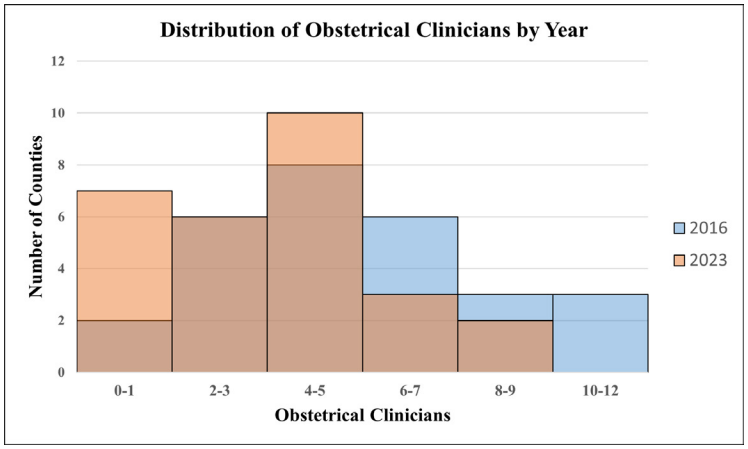

Figure 2. Histogram of obstetrical clinicians in each county for 2016 and 2023.

Overall, access to obstetric care in rural Kansas declined between 2016 and 2023, with a corresponding expansion of maternity MCDs. As shown in Figure 3, MCDs now encompass much of western Kansas and parts of the southeast. Counties without obstetrical clinicians are shown in white, those with declining clinician numbers in orange, and those where services have been discontinued since 2016 in red.

DISCUSSION

Authors of this study examined the availability and trends of obstetric clinicians in rural Kansas counties and compared these findings with data from a similar 2016 study. The results indicate declining access to rural obstetric clinicians, contributing to the expansion of both previously identified and newly emerging MCDs. Multiple factors likely contribute to this trend, including the high cost of maintaining obstetric units with in-house anesthesia, rising liability insurance costs, and increasing the number of physician call burden.

The expansion of MCDs and the reduction in obstetric care availability likely are to adversely affect maternal and neonatal outcomes.[10] Additionally, hospitals that lose obstetric clinicians may place increased strain on remaining clinicians and resources, potentially leading to burnout and further workforce attrition.

Targeted strategies to increase the number of obstetric clinicians in rural Kansas are urgently needed. Potential approaches include loan repayment programs, scholarships for trainees from rural backgrounds, and tax incentives for clinicians practicing in rural areas.[10] Expanding shadowing and mentorship opportunities for medical students and residents interested in obstetric care may help foster early interest, build confidence, and support long-term commitment to rural practice. The Kansas Medical Student Loan Program, a state-funded initiative that supports tuition and living expenses at the University of Kansas School of Medicine in exchange for service in underserved communities,[11] represents a successful model. This program could be expanded to allow family physicians to complete obstetric fellowships, thereby increasing the number of clinicians eligible for obstetric privileges in rural settings. Additionally, partnerships between academic centers and rural hospitals could support knowledge sharing, training, and teleconsultation for high-risk pregnancies, helping to mitigate the impact of MCDs.

Limitations. This study has several limitations. Survey responses were accepted from a range of health care team members (e.g., physicians, receptionists, charge nurses, etc.) to maximize response rates. However, reliance on a single respondent per facility may have introduced variability and potential bias based on individual perspectives. Additionally, the findings may not be generalizable beyond Kansas.

CONCLUSIONS

Access to obstetric care in rural Kansas continues to decline, with a corresponding expansion of MCDs. These trends pose significant risks to maternal and neonatal outcomes and place additional strain on an already limited workforce. Addressing this issue will require targeted, multifaceted strategies, including

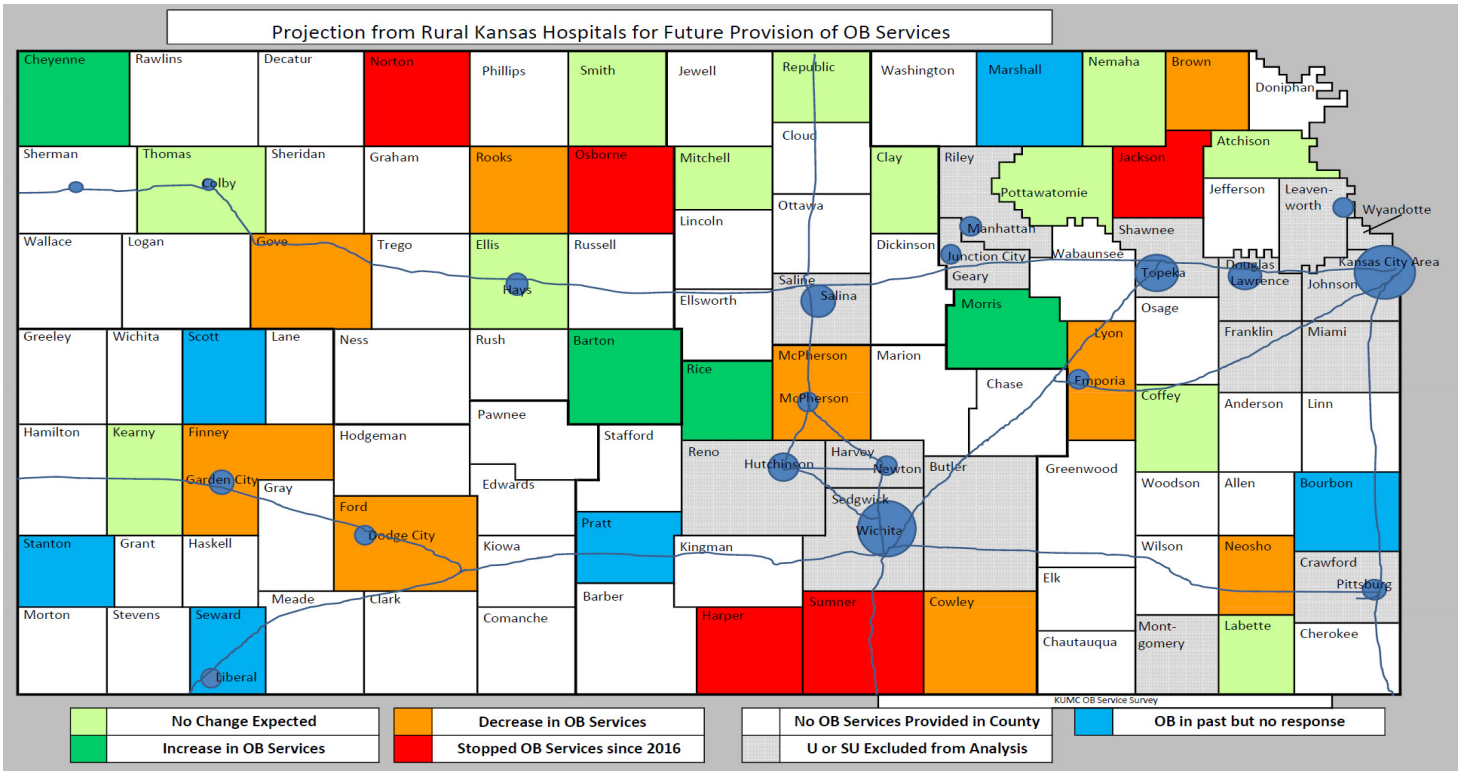

Figure 3. Rural Kansas obstetric clinician change from 2016 to 2023.

workforce incentives, expanded training pathways, and strengthened partnerships between academic and rural health systems. Timely intervention is important to stabilize and rebuild the rural obstetric care infrastructure.

ARTICLE INFORMATION

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Corresponding Author: Anna Carlson, The University of Kansas School of Medicine-Wichita, Wichita, Kansas, 1010 N. Kansas St., Wichita, KS, 67214, acarlson11@kumc.edu.

Author Affiliations: The University of Kansas School of Medicine-Wichita, Wichita, Kansas (Carlson, Aguirre); The University of Kansas School of Medicine-Kansas City, Kansas City, Kansas (Young, Hoefferle, Kennedy, Witt); Department of Family Medicine and Community Health, The University of Kansas School of Medicine-Kansas City, Kansas City, Kansas (Hoefferle, Kennedy, Witt).

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REFERENCES

1. Kozhimannil KB, Hung P, Henning-Smith C, Casey MM, Prasad S. Association between loss of hospital-based obstetric services and birth outcomes in rural counties in the United States. JAMA 2018; 319(12):1239-1247. PMID: 29522161.
2. Liu L, Oza S, Hogan D, et al. Global, regional, and national causes of under-5 mortality in 2000-15: An updated systematic analysis with implications for the sustainable development goals. Lancet 2016; 388(10063):3027-3035. Epub 2016 Nov 11. Erratum in: Lancet 2017; 389(10082):1884. PMID: 27839855.
3. Kozhimannil KB, Shippee TP, Adegoke O, Vemig BA. Trends in hospital-based childbirth care: The role of health insurance. Am J Manag Care 2013; 19(4):e125-132. PMID: 23725450.
4. Wallace M, Dyer L, Felker-Kantor E, et al. Maternity care deserts and pregnancy-associated mortality in Louisiana. Womens Health Issues 2021; 31(2):122-129. PMID: 33069560.
5. Joseph KS, Lisonkova S, Boutin A, et al. Maternal mortality in the United States: Are the high and rising rates due to changes in obstetrical factors, maternal medical conditions, or maternal mortality surveillance? Am J Obstet Gynecol 2024; 230(4):440.e1-440.e13. PMID: 38480029.
6. Sugg M, Shakya S, Ulrich S, Tyson JS, Runkle J. Mapping maternity care deserts: Driving distance and health outcomes in North Carolina. J Rural Health 2025; 41:e70020. PMID: 40197746.
7. Cuschieri S. The STROBE guidelines. Saudi J Anaesth 2019;

13(Suppl 1):S31-S34. PMID: 30930717.
8. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009; 42(2):377-381. PMID: 18929686.
9. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software partners. J Biomed Inform 2019; 95:103208. PMID: 31078660.
10. Atwani R, Robbins L, Saade G, Kawakita T. Association of maternity care deserts with maternal and pregnancy-related mortality. Obstet Gynecol 2025; 146(2):181-188. PMID: 40570350.
11. University of Kansas Medical Center. Kansas Medical Student Loan (KMSL). 2026. https://www.kumc.edu/academic-and-student-affairs/departments/student-financial-aid/financial-aid/loans/loan-programs/kansas-medical-student-loan.html. Accessed February 24, 2026.

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Appendix: Obstetrical Services Offered in Nonurban Kansas Counties Survey.

1. How many physicians (FM or OBGYN) deliver babies at this hospital? (*Numerical*)
2. To the best of your knowledge, how many midwives deliver babies in the surrounding community? (*Numerical*)
3. Do you anticipate any of the providers who deliver babies to retire/stop delivering babies in the next 5 years? (*Yes/No*)

   How many?
4. Have any providers that delivered babies in your hospital retired/stopped delivering babies since 2015? (*Yes/No*)

   How many?

   Comments?
5. Do you anticipate continuing to offer obstetrical care and services for the next 10 years? (*Yes/No*)

   Comments?